size from the outer to the innermost cell, and vary in number from fourteen to twenty-six. In some instances, small papillæ are observable on the external surface of the integument, which are probably vestiges of the bases of the pseudopodia or tentacula.

Drawings of the various specimens described by the author accompany the paper.

"Microscopic Observations on the so-called Vesicular Vapours of Water as existing in the Vapours of Steam, and in Clouds," &c. By A. Waller, M.D. Communicated by P. M. Roget, M.D., Sec. R.S.

From some experiments, of which the author published an account in the Philosophical Magazine of last February, he was led to conclude that the opaque vapours of condensed steam consist of minute globules or spherules of water, and not of small vesicles, as is implied in the generally received theory, according to which this condition of water is designated by the term *vesicular vapour*. In the present paper, he relates a set of experiments confirming by microscopic observation his views of the globular condition of the particles of opaque vapours; premising a short retrospect of the opinions of Sir Isaac Newton, Halley, Kratzenstein, and De Saussure on this subject. Finding it impossible to observe the globules with any high magnifying power while they are at liberty to move, the author adopted the plan of fixing the condensed vapours arising from the breath or other sources, in some liquid, such as oil, which has no affinity with water. Of the many vehicles which he has tried, he finds Canada balsam to be that which is best adapted for these observations. By breathing with a little force on a slip of glass previously covered with a thin layer of balsam, the vapours of the breath are not only condensed on its surface, but penetrate beneath, where they may be recognised in opaque streaks of a white colour, and where they remain stationary for more than an hour; or, if covered with another thin piece of glass or talc, for a much longer period. These streaks are decomposed under the microscope into minute globules perfectly spherical, like shot, or the globules of mercury. The author describes, at some length, the various appearances presented under different circumstances, and with different oily fluids; and gives drawings of these appearances as exhibited by the microscope.

"Experiments relative to Animal Temperature, showing that there must be some source of animal heat besides the combustion of the Carbon and the Hydrogen contained in the Food of Animals." By Robert Rigg, Esq., F.R.S.

The subject of these experiments was a labouring man in the employment of the author, living on his ordinary food, and working at his usual employment. A strict examination was instituted into the quantity and chemical constituents of the ingesta and egesta during ten days; at the end of which time he had gained one pound in weight. He infers from the results of this experiment, that the carbon and hydrogen contained in the food of animals, which enter

into combination with the respired oxygen, forming carbonic acid and water, do not generate sufficient heat for the purposes of animal life; and that consequently there must be some other sources of heat in the animal economy, one of which he believes to be the secretion of carbon.

"Electro-Physiological Researches.—Fourth Memoir. On the Physiological Action of the Electric Current." By Charles Matteucci. Communicated by Michael Faraday, Esq., LL.D., F.R.S.

In the prosecution of his inquiries on the physiological action of electric currents, the author found it necessary to employ an apparatus, which was expressly made for him by M. Bréguet, adapted to the delicate appreciation of the intensity of the force of the muscular contractions excited by those currents; of which apparatus he gives a minute description, illustrated by a drawing. He was thus enabled to institute an exact comparison between the contractions caused by the direct, and those by the reverse currents, both at the commencement and at the termination of their action. The following are the general conclusions he deduces from the experiments thus conducted.

1. The passage of the electric current through a mixed nerve produces a variation in the excitability of the nerve, differing essentially in degree, according to the direction of the current through the nerve. This excitability is weakened and ultimately destroyed; and this takes place more or less rapidly according as the *direct current*, that is, a current circulating through the nerve from the centre to the periphery, is more or less intense. On the other hand, by the passage of the same current in the contrary direction, that is, from the periphery to the centre, or the *inverse current*, the excitability is preserved and increased.

2. The variations in the excitability of the nerve produced by the passage of the current, tend to disappear more or less rapidly on the current ceasing. If the nerve be taken from a living animal, or from one in which life is but just extinct, so that its excitability is very great, these variations last only as long as the current continues to circulate; while, if the nerve has already lost some of its excitability, they survive the cessation of the current by a period of from one to ten or fifteen seconds.

3. If the same current be made to act upon a mixed nerve, the contraction which occurs on the first moment of its introduction is very different according to its direction; the direct current always occasioning a stronger contraction than that produced by the inverse current.

"On Phlogiston and the Decomposition of Water." By W. F. Stevenson, Esq., F.R.S.

The author is of opinion that the evidence on which the modern theory of the composition of water is founded, is fallacious; and believing water to be a simple body, he conceives that it forms hydrogen by combining with the electric fluid, which he imagines